TABLE 3.—*Free-air resultant winds based on rawin observations made near 0300 G. C. T. during April 1949. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Speeds in meters per second*

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,636 m.)			Big Spring, Tex. (774 m.)			Bismarck, N. Dak. (505 m.)			Brownsville, Tex. (7 m.)			Caribou, Maine (191 m.)			Charleston, S. C. (13 m.)			Columbia, Mo. (237 m.)			Grand Junction, Colo. (1,473 m.)			Greensboro, N. C. (275 m.)			Hatteras, N. C. (3 m.)			International Falls, Minn. (358 m.)			Little Rock, Ark. (80 m.)			Medford, Oreg. (401 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	30	202	1.5	30	96	2.3	30	69	0.9	30	102	3.2	30	322	1.4	30	218	1.1	30	357	1.3	30	339	0.6	30	278	1.5	30	233	1.5	30	208	0.6	30	280	0.4	30	317	2.7
500	---	---	---	---	---	---	---	---	---	30	114	5.0	30	296	2.7	30	250	5.1	30	17	.8	---	---	---	30	267	3.4	30	259	5.6	30	230	1.3	30	275	1.1	30	317	3.4
1,000	---	---	---	30	97	3.5	28	276	1.7	30	117	3.6	30	289	3.3	30	253	6.2	28	348	.7	---	---	---	30	273	6.2	30	269	7.2	30	267	3.9	30	267	2.9	30	308	3.7
1,500	---	---	---	30	110	1.9	28	289	4.3	30	139	1.9	30	285	3.5	30	264	7.7	28	295	2.1	28	335	.8	30	271	6.7	30	274	9.0	30	280	5.4	30	277	4.3	30	286	2.2
2,000	30	213	.9	30	238	1.6	28	297	6.4	30	241	1.8	30	282	4.5	30	268	9.5	28	296	3.8	28	326	1.6	30	269	8.0	28	269	7.4	30	293	6.5	30	265	5.9	30	257	1.4
2,500	30	258	2.0	30	262	3.8	28	300	7.8	30	251	3.8	29	287	5.4	30	270	10.8	28	302	5.4	28	315	2.0	30	272	9.2	28	275	10.1	30	296	7.0	30	267	6.4	30	243	2.8
3,000	29	286	4.3	30	272	5.2	29	302	8.6	30	243	5.5	29	283	7.3	30	269	12.0	28	302	7.7	29	313	2.7	30	269	10.8	27	272	11.5	30	304	7.7	30	268	7.8	30	245	3.8
4,000	29	288	5.3	30	278	8.5	30	305	9.7	30	246	8.7	29	286	9.0	28	273	12.8	28	298	9.5	29	322	3.5	30	271	12.6	24	267	16.3	30	305	9.6	29	268	10.0	30	271	6.9
5,000	28	305	5.9	30	277	10.5	30	304	11.1	30	254	12.6	29	273	10.1	26	252	16.1	26	294	10.7	29	314	4.4	30	272	17.7	23	288	18.9	30	300	11.5	27	270	12.4	30	265	8.0
6,000	28	315	7.5	30	279	11.1	28	300	12.3	30	258	16.7	28	281	12.5	24	257	17.2	25	298	11.8	30	325	7.4	27	280	20.2	21	274	20.1	29	296	13.6	22	254	12.4	29	267	8.8
8,000	26	296	10.4	28	264	16.7	23	283	12.2	28	261	20.3	27	280	15.3	19	254	22.7	22	289	15.6	27	296	7.0	25	285	27.1	17	257	27.2	25	300	15.0	21	238	18.7	22	261	11.8
10,000	23	277	17.3	24	275	21.0	20	276	11.9	23	262	24.7	20	263	23.0	16	271	26.2	15	262	19.7	22	290	10.1	20	269	21.5	12	287	31.6	20	307	14.6	19	238	25.7	19	259	10.7
12,000	17	284	19.7	18	261	26.3	12	304	11.5	11	268	18.4	10	260	18.3	---	---	---	10	268	23.6	14	291	12.0	11	259	36.2	---	---	---	10	316	17.0	13	252	30.0	13	263	8.9
14,000	---	---	---	12	254	20.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	65	13.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Altitude (meters) m. s. l.	Miami, Fla. (12 m.)			Nantucket, Mass. (14 m.)			Nashville, Tenn. (180 m.)			New Orleans, La. (6 m.)			Oakland, Calif. (8 m.)			Oklahoma City, Okla. (392 m.)			Rapid City, S. Dak. (980 m.)			San Antonio, Tex. (242 m.)			San Juan, P. R. (28 m.)			St. Cloud, Minn. (318 m.)			Santa Maria, Calif. (72 m.)			Sault Ste. Marie, Mich. (221 m.)			Spokane, Wash. (726 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	30	133	0.6	29	254	0.9	30	298	0.9	30	69	0.6	30	274	4.5	29	180	0.3	30	157	1.3	30	47	2.1	30	103	3.3	30	180	0.1	30	270	2.6	30	312	1.9	30	221	2.3
500	30	159	2.2	29	256	4.2	30	285	.4	30	207	.4	30	291	4.2	29	202	.6	---	---	---	30	80	3.2	30	93	6.3	29	239	.7	29	333	3.6	30	308	2.1	---	---	---
1,000	30	205	1.7	29	284	4.4	30	238	4.1	30	263	1.5	30	295	3.7	29	215	.7	30	158	1.3	30	115	2.5	29	94	6.4	29	296	2.4	29	337	4.7	30	311	2.1	30	234	4.4
1,500	30	219	3.2	29	286	5.6	30	232	6.1	30	262	1.8	30	300	2.5	30	309	.9	30	213	2.1	30	173	1.9	28	92	5.6	29	303	3.5	29	357	4.0	30	308	3.2	30	242	6.1
2,000	30	227	3.8	28	283	8.8	30	262	7.0	30	255	3.3	30	313	2.5	30	289	3.2	30	267	3.5	30	242	2.9	28	90	4.7	29	304	4.6	29	6	4.2	30	308	4.8	30	247	7.0
2,500	30	236	4.1	28	281	9.2	30	269	9.5	29	253	6.0	30	317	2.2	30	279	4.3	30	284	5.0	30	261	4.8	28	89	4.2	29	300	5.7	29	355	4.5	30	312	5.3	30	249	7.5
3,000	30	232	4.3	27	280	11.3	30	273	12.0	29	265	7.7	30	293	2.2	30	284	6.2	28	294	6.7	30	269	6.2	28	85	4.0	29	310	7.4	30	342	3.5	29	312	6.5	30	260	8.4
4,000	29	244	8.5	25	275	15.1	29	278	13.6	28	259	11.3	30	293	2.7	30	288	7.6	28	307	8.7	29	269	10.0	29	82	3.1	29	307	9.3	30	310	4.2	28	311	8.0	30	259	10.1
5,000	29	257	11.1	25	271	18.6	27	277	15.0	27	260	15.2	30	302	4.4	30	281	8.6	27	310	9.0	28	263	13.1	29	63	1.5	28	301	9.9	30	304	5.2	28	306	8.4	28	259	12.0
6,000	29	256	14.2	22	273	20.0	26	277	17.7	27	259	19.8	30	295	7.0	30	280	10.1	23	307	8.2	28	264	15.7	27	249	.3	28	296	10.1	30	299	7.6	27	301	10.5	26	262	12.4
8,000	28	263	20.1	13	272	20.2	21	256	23.5	22	252	24.7	28	282	9.8	28	271	12.8	17	266	5.4	26	262	21.0	26	297	6.5	25	288	10.6	29	293	11.2	24	292	12.6	21	277	13.0
10,000	26	284	24.0	---	---	---	16	248	31.1	16	256	26.4	23	262	11.9	25	256	17.4	15	275	11.7	21	270	25.4	26	296	15.8	22	302	13.2	25	264	16.3	13	314	10.3	18	278	15.5
12,000	22	287	28.8	---	---	---	---	---	---	---	---	---	16	264	14.3	18	256	21.6	---	---	---	12	265	27.2	25	295	22.3	21	301	12.5	22	270	19.5	---	---	---	12	275	13.1
14,000	12	264	31.2	---	---	---	---	---	---	---	---	---	10	262	11.0	14	254	16.7	---	---	---	---	---	---	18	291	20.9	13	282	10.4	17	267	16.6	---	---	---	---	---	---
16,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	15	256	11.1	---	---	---	---	---	---
18,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	265	6.4	---	---	---	---	---	---

Altitude (meters) m. s. l.	Tatoosh Island, Wash. (33 m.)		
	Observations	Direction	Speed
Surface	30	209	2.2
500	30	208	4.1
1,000	29	219	5.0
1,500	29	226	6.8
2,000	29	236	8.1
2,500	29	238	9.3
3,000	29	242	10.1

Altitude (meters) m. s. l.	Tatoosh Island, Wash. (33 m.)		
	Observations	Direction	Speed
4,000	28	245	13.4
5,000	28	249	17.3
6,000	26	263	18.5
8,000	21	267	26.0
10,000	15	261	20.8
12,000	12	262	23.3

NOTE.—Resultants prepared from rawins at high altitudes are biased toward lower wind speeds. Values appearing in this table should therefore be used with caution when the number of observations missing is greater than three. See note following Table III in the June 1948 issue of the MONTHLY WEATHER REVIEW.

RIVER STAGES AND FLOODS FOR APRIL 1949

The most damaging floods during the month occurred in the lower Rio Grande in Texas, seriously affecting growing crops. Considerable damage also resulted from the flash flood at Herington, Kans., and from the flooding on the Souris and Heart Rivers in North Dakota in connection with the ice break-up there. The crest on the lower Missouri at Nebraska City, Nebr., was second only to the great ice jam flood of March 1949, but was the highest of record for stages uninfluenced by ice conditions.

Precipitation during April was mostly below normal (see chart V). It was above normal over most of the southern states, portions of the Missouri Basin, and the central portion of the northeastern states. The heaviest precipitation occurred in northern Florida and southern Texas where it averaged 200 percent of normal.

Hudson Bay drainage.—Snowfall was heavy during the winter in the Red River Valley of the North from Fargo-Moorhead, northward to the Canadian border. The snow-cover ranged from 12 to 26 inches in this section with local depths of 61 inches at Grafton and 33 inches at Hannah, N. Dak. by the end of February. South of Fargo, the snow-cover was much lighter ranging up to 11 inches. During the second week of March, the water equivalent of the snow-cover ranged from 3 to 5 inches in the northern portion, with the heavier amounts in the Devil's Lake and Souris basins, and from 1 to 2 inches in

the southern portion. The average precipitation from November through March was 3.81 inches, which was considerably lighter than one year ago when it averaged 4.85 inches.

The Forest and Park Rivers began to overflow on April 8 in the vicinity of Minto and Grafton, N. Dak., respectively. On the 9th, the Red River of the North began overflowing at Grand Forks, N. Dak., cresting on the following day at a stage of 29.2 feet, 1.2 feet above bankfull stage, but considerably below last year's crest of 41.6 feet. No other flooding occurred along the main stem. The highest stage reached at the Fargo-Moorhead gage was 12.8 feet, 4.2 feet below bankfull stage or 5.2 feet below last year's crest of 18 feet. Some damage resulted to highways and farm equipment in the vicinity of Minto and Grafton, N. Dak.

Atlantic Slope Drainage.—Stream flow was considerably below normal in the Connecticut and Merrimack River Basins during April even though precipitation was near normal as there was very little runoff from melting snow. The light seasonal snowfall was depleted early and by April 1, 95 percent of the snow cover had already melted (see chart VII). The highest stage reached by the Connecticut at Hartford, Conn., this spring was 14.5 feet, 1.5 feet below bankfull stage, in March. In the past 100 years, only 5 maximum spring stages have been equal to or less than this low value at that point.

Moderate to heavy rises in the streams in the Middle Atlantic States resulted from the heavy rains on the 13th and 14th with major flooding on the Jackson and upper James Rivers and minor flooding in the upper Rappahannock and Roanoke Rivers.

The rain in the upper Rappahannock in Virginia averaged 1.5 inches and caused light local flooding for a few hours at Remington, Va., on the 14th. The rains were much lighter in the lower Rappahannock and on the Rapidan and resulted in stages near one-half bank full.

In the Jackson River Basin, the rainfall averaged 3.1 inches and in the James River above Lynchburg, Va., 2.3 inches in the 24-hour period ending in the afternoon of the 13th. This storm produced the highest water at and above Buchanan, Va., since the great flood of 1936. The principal damage resulting from the flood was to the road bed of the C&O railroad at Kincaid Gorge between Covington and Hot Springs where two washouts occurred, and near Lowmoor on the main line where a fill gave way necessitating the use of east bound tracks only. Two slides on Route 60 between Covington and Clifton Forge blocked the highway for a while but were cleared for one-way traffic early on the 14th. In Covington, 13 homes were evacuated as a precautionary measure and schools closed. Below Buchanan the only damage of consequence was the washing out of a small bridge on a secondary highway at Buffalo station in Nelson County. Only minor flooding occurred below Bremo Bluff.

The Roanoke River rose rapidly to above flood stage at Alta Vista, Va., due to the heavy rain (2 inches) in the Bedford area. The crest flattened considerably as it moved downstream; as a result, the river just reached flood stage at Weldon, N. C., and with the exception of Williamston, did not reach flood stage at any other station.

East Gulf of Mexico drainage.—Heavy rain from the 28th through the 30th caused flooding in several streams in the East Gulf of Mexico drainage during the latter part of April and the beginning of May. Rainfall ranged from 1 inch to as much as 6 inches in the upper Flint and middle Chattahoochee Rivers.

A rapid rise on the Tallapoosa River at Milstead, Ala., amounted to 31.8 feet in the 24-hour period ending at 7:30 a. m., on the 30th. The river crested at a stage of 41.5 feet, 1.5 feet above flood stage during the afternoon of that date.

Upper Mississippi Basin.—The light flood in the Minnesota River at Mankato, Minn., was due to moderately heavy rain and snow that fell during the closing days of March when the river was at a high stage as a result of the spring ice break-up.

By the end of April, base ground flow in the tributary streams in Wisconsin was unusual for this month. Usually the stream flow is the greatest for the year during April but due to gradual snow-melt and precipitation far below normal, there was barely enough run-off to satisfy the storage requirements of the headwater reservoirs. Nearly normal flat pools were attained in the Mississippi River between St. Paul and Lock and Dam No. 10 by the 30th. Light flooding occurred at Hannibal and Louisiana, Mo.

Missouri Basin.—The streams in the central and western portions of the Elkhorn Basin in Nebraska were generally rising at the beginning of the month due to the rapid melting of the heavy snow that fell during the period from March 26 through March 31. The heavy snow in the western and northern sections of the Elkhorn Basin accumulated to depths of 8 to 15 inches in the Neligh-Atkinson area and from 5 to 8 inches in the Royal-Randolph area. Rapid thawing from March 27–29 produced overflows from Ewing westward to Atkinson, Nebr., on March 28. On March 30, heavy rain (in excess of 1 inch) occurred in the northern and central sections of the valley. On March 31, overflows were occurring from the headwaters of the Elkhorn to Meadow Grove, and near West Point, Nebr., light flooding occurred at some points through April 12

Much flooding occurred on the Souris River and its tributaries in north-central North Dakota between the 3d and 20th due to the melting of the heavy snow cover in that region. U. S. Highway No. 2 was closed from April 4th to the 9th and many other roads were closed for longer periods while under water. Several basements were flooded at Velva and Minot, N. Dak.

The local flooding on the Cannonball, Little Missouri, Heart and Knife Rivers in North Dakota during the latter part of March was due to the ice break-up and run-off from the melting of the heavy snow cover. The snow-melt caused the small streams to run near bank full but no flooding would have occurred if the rivers had been clear of ice.

Serious flooding developed on the Heart River in the Mandan, N. Dak., area due to severe ice jams during the latter part of March, and early April. It was running bank full and was full of ice on March 28 from south of Richardton to south of New Salem, N. Dak. It began to overflow the lowlands near Mandan in the early afternoon of that date and on the following day as the dike on the southeast side of "Dogtown" broke, flooded state highway No. 6, and U. S. Highway No. 10 between Bismarck and Mandan. On March 30th, there was water in about 100 houses, south of the Northern Pacific Railway tracks in Mandan. The ice jams were dynamited several times but new jams formed after the old ones were blown out. The ice jam at the "Dogtown" bridge broke on April 1st; by the 3d most of the water had receded from the Mandan area and on the 6th, U. S. Highway No. 10 was reopened.

The Big Sioux River rose above flood stage at Akron, Iowa, on March 29, and remained above flood until April 2. A secondary rise caused it to overflow again at Akron from the 6th to the 11th. The secondary crest was 5 feet above flood stage but due to the early season of the year no damage occurred.

The high water on the Missouri River during April was

due largely to melting snow and the spring ice break-up along the main stem and tributaries above Pierre, S. Dak. The low temperatures during the winter favored unusually heavy ice to form on the majority of streams. These low winter temperatures and heavy precipitation are illustrated by the charts which appeared in the reports of River Stages and Floods in the February and March issues of the REVIEW, and are discussed in detail in the article by William H. Klein which appears in this issue.

The ice had broken on the Missouri as far north as Pierre, S. Dak., by March 24, but did not break, at Mobridge until April 1. Two crests came down the Missouri; the first occurred at Bismarck on April 3, reaching Sioux City, Iowa on the 8th; the second occurred at Bismarck on the 6th, reaching Sioux City on the 10th. The river was high in the Garrison-Bismarck area from the 1st to the 4th but no flooding occurred. Bank full stages were exceeded at several points in the Missouri below Mobridge, S. Dak. The floods were not as serious as in February and March. The most outstanding feature of the floods this month was the high stage at Nebraska City, Nebr., where the crest of 20.3 on the 13th and 14th was second only to the great ice jam flood of the previous month, when a stage of 25.8 feet was reached. However, the April crest was the highest of record unifluenced by ice conditions; the previous high mark of 20.2 occurred in 1947. The damages along the main stem were mostly light but would have been much larger had it not been preceded by severe flooding during the 1st quarter of 1949.

The worst flood in two decades and the most destructive in the history of Herington, Kans., occurred in the west and north sections of that city on the evening of April 30. The flash-flood waters moved down Lime Creek, which flows in a northerly course across the low areas of Herington. The water reached a depth of over 5 feet in the City Building. Much of the damage was concentrated in a three-block business section outside of the main part of the city. The flood waters were believed to be about four inches under the 1929 flood level, which claimed a number of lives. No lives were lost in this flood, but several injuries were reported. However, the intensity of this flood was thought to be much greater and the financial loss much larger.

This flood was due to intense heavy rain over the small drainage basin. Rainfall 2½ miles west southwest of the city at Lake Herington, totaled 1.8 inches but was apparently much heavier along Lime Creek.

Forty families were rendered homeless pending repairs to their homes. Three houses were floated from their foundations, several porches were washed away and several cars floated through the inundated streets.

Ohio Basin.—Stages continued above flood in the lower portion of the Ohio and lower tributaries during the first few days of the month due to the heavy rain on March 26 and 27. The only additional flooding that resulted from this storm was on the Tennessee River at Gilbertsville, Ky., and Whitesburg, Ala.

White, Arkansas and Red Basins.—Flooding occurred in the White Basin in the White and Black Rivers during March and April. The lower White fell below bankfull stage at Clarendon and St. Charles, Ark., during the latter part of April for the first time since mid-January. All crests during March and April were secondary and were only slightly above flood stage except the Black. Planting was delayed on lowlands adjacent to these streams; otherwise, loss was negligible.

The only flooding in the Arkansas Basin during April was a minor overflow on the Neosho River in the vicinity of Emporia, Kans., on the 11th and was due to rainfall averaging 1.5 inches above that point. Unofficial reports were received of amounts over 3 inches between Council Grove and Emporia, Kans.

The winter season snowfall averaged 57.9 inches in the Upper Arkansas and Purgatoire River Basins or 103 percent of normal. The water equivalent of this snow was 3.15 inches or 111 percent of normal but soil moisture in this area was largely deficient.

In the Red Basin, minor flooding occurred on the Black, Ouachita, and Sulphur Rivers. The flooding on the Sulphur at Hagansport, Tex., was due to scattered moderate to heavy showers on the 10th and 11th, 26th and 27th.

Lower Mississippi Basin.—Rainfall averaged near or slightly below normal over the Yazoo-Tallahatchie River Basins during April. With the exception of an unimportant rise on the Tallahatchie at Swan Lake, Miss., about the middle of the month, the river levels were generally receding. Local flooding occurred on the Coldwater at Sarah, Miss., due to the heavy rains from the 11th–13th.

The only flooding on the main stem of the Lower Mississippi during April was at Caruthersville, Mo., and Baton Rouge, La. The flooding at Caruthersville was due to the heavy rain over the middle Msssissippi and lower Ohio on March 26 and 27.

West Gulf of Mexico drainage.—The Calcasieu remained very close to or above flood stage throughout the month with a crest of 16.8 at Kinder, La., on the 13th, and 19.8 on the 25th, due to scattered heavy rains on the 5th, 10–11th, 21st–23d, and the 28th. This flood was minor and the main loss was due to the delay in planting crops.

The light flooding on the Bayou Nezpique at Basile, La., was the result of heavy rains from the 21st to the 23d which totaled 6 to 8 inches at some stations.

The slight overflow of the Neches River at Evadale, Tex., from the 2d to the 6th, was due to heavy rains (4 inches) during the last decade of March. The overflow of the Trinity near Liberty, Tex., was due to heavy rains averaging 2.06 inches below Long Lake, on the 20th. No damage occurred.

The Nueces River rose rapidly to above flood stage as a result of the heavy rains from the 19th to the 26th. No serious flooding occurred as the rises downstream were well out of the way before the rise from upstream reached the lower portions of the river.

This same storm caused major flooding on the Guadalupe River from Gonzales, Tex., to the mouth. There were two distinct rises at Gonzales and above but the two bodies of water had merged by the time it reached Cuero and Victoria, Tex. The major rises resulted from the heavy rains over the basin on the 24th and 25th. The heaviest rain, however, was over the Blanco River basin with 7.74 inches at Blanco, Tex., on the 24th. There was considerable damage from the heavy rains and flash floods on the smaller streams of the headwaters of all rivers mostly to bridges and streets, but damage from the floods in the major rivers was only moderate.

The flooding on the lower Rio Grande at and below Rio Grande City was due to heavy rains of 5 to 10 inches between Rio Grande City and Laredo, Tex., during the period from 23d to the 25th. The heavier rains fell on the Mexican side of the Rio Grande. According to the International Boundary Commission, this was the greatest flood ever to occur in April, in respect to volume. Very little rain fell elsewhere in the valley during the flood, so practically all of the flow came from the basin between Rio Grande City and Laredo. Considerable damage resulted to planted crops in the flood plain.

FLOOD STAGE REPORT FOR APRIL 1949

[All dates in April unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
HUDSON BAY DRAINAGE					
	Feet			*Feet*	
Red of North: Grand Forks, N. Dak.	28	9	12	29.2	10
ATLANTIC SLOPE DRAINAGE					
Rappahannock: Remington, Va.	15	14	14	15.5	14
Jackson: Covington, Va.	7	13	14	12.7	14
James:					
Lick Run, Va.		13	14	21.5	14
Buchanan, Va.	17	14	14	20.1	14
Bremo Bluff, Va.	19	14	16	24.0	15
Columbia, Va.	18	14	16	24.0	15
State Farm, Va.	12	15	16	15.2	16
Richmond, Va.	8	15	16	10.5	16
Roanoke:					
Alta Vista, Va.	10	14	15	11.7	15
Weldon, N. C.	31	16	16	31.1	16
Williamston, N. C.	10	Mar. 28	8	11.0	1
		18	29	10.5	20
EAST GULF OF MEXICO DRAINAGE					
				23.6	Dec. 6
				20.6	Jan. 11
Apalachicola: Blountstown, Fla.	15	Dec. 1	26	20.9	Feb. 14
				18.4	Mar. 1
				18.2	18
Tallapoosa: Milstead, Ala.	40	30	30	41.5	30
Black Warrior:					
Tuscaloosa Lock and Dam, Ala.	47	Mar. 31	1	49.5	1
Lock No. 7, Eutaw, Ala.	35	Mar. 28	8	47.5	3
Tombigbee:					
Aberdeen, Miss.	34	Mar. 28	2	39.0	1
Columbus, Miss.	29	Mar. 31	4	29.9	2
Gainesville, Ala.	36	Mar. 30	11	44.9	5
Lock No. 4, Demopolis, Ala.	39	Mar. 28	14	56.2	6
Lock No. 3	33	Mar. 23	17	56.4	7
Lock No. 2	46	Mar. 29	15	57.8	8
Lock No. 1	31	Mar. 25	18	38.7	11
Chickasawhay:					
Enterprise, Miss.	20	Mar. 31	3	26.8	1
Shubuta, Miss.	30	Mar. 30	8	36.5	4
Waynesboro, Miss.	35	3	5	36.4	4
Leaf:					
Hattiesburg, Miss.	22.5	1	4	25.7	3
Beaumont, Miss.	20	1	8	26.6	4
Pascagoula: Merrill, Miss.	22	Mar. 30	10	24.4	6
Bogue Chitto: Franklinton, La.	11	Mar. 31	2	13.7	1
Pearl:					
Edinburg, Miss.	20	Mar. 27	6	22.8	2
Jackson, Miss.	18	Mar. 24	18	30.7	2
Monticello, Miss.	15	Mar. 27	17	25.2	2
Columbia, Miss.	17	Mar. 29	17	24.0	3
				16.7	Nov. 30
				15.0	Jan. 15
				15.8	Jan. 27
Pearl River, La.	12	Nov. 24	30	16.1	Feb. 22
				13.4	Mar. 20
				15.7	Mar. 26
				16.2	8
MISSISSIPPI SYSTEM					
Upper Mississippi Basin					
Minnesota: Mankato, Minn.	19	1	4	19.9	3
Mississippi:					
Hannibal, Mo.	13	Mar. 31	10	14.3	2
Louisiana, Mo.	12	Mar. 31	11	13.2	3
		13	21	12.2	16, 17, 18
Missouri Basin					
Knife: Hazen, N. Dak.	22	3	3	24.1	3
Big Sioux: Akron, Iowa	12	Mar. 29	2	16.2	Mar. 31
		6	11	17.0	9
Elkhorn:					
Neligh, Nebr.	10	5	8	11.2	7
West Point, Nebr.	12	10	12	12.5	11
Grand:					
Chillicothe, Mo.	18	Mar. 31	1	22.9	Mar. 30
Sumner, Mo.	25	Mar. 31	2	28.9	Mar. 31
Brunswick, Mo.	12	Mar. 28	3	15.1	1
		12	19	13.4	16–18
Chariton: Novinger, Mo.	19	Mar. 30	3	23.0	3
Missouri:					
Pierre, S. Dak.	15	5	5	15.0	5
Geddes, S. Dak.	12	5	9	13.0	6–7
				13.5	9
Blair, Nebr.	19	8	13	21.1	12
Omaha, Nebr.	19	10	14	20.0	13
Nebraska City, Nebr.	15	1	17	20.3	13–14
Brownville, Nebr.	15	Mar. 28	17	20.9	14
Rulo, Nebr.	17	7	17	21.3	16
St. Joseph, Mo.	17	10	18	19.4	16
Atchison, Kans.	20	8	18	23.1	16–17
Leavenworth, Kans.	19	14	18	20.0	17
Waverly, Mo.	18	Mar. 30	1	19.2	Mar. 31
		11	19	19.3	17–18
Hermann, Mo.	21	2	2	21.0	2
St. Charles, Mo.	25	1	3	26.6	2

FLOOD STAGE REPORT FOR APRIL 1949—Continued

[All dates in April unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
MISSISSIPPI SYSTEM—continued					
Ohio Basin					
	Feet			*Feet*	
Green: Lock No. 2, Rumsey, Ky.	34	Mar. 25	4	36.7	1
West Fork:					
Elliston, Ind.	18	Mar. 27	1	23.6	Mar. 29
Edwardsport, Ind.	12	Mar. 27	5	20.3	Mar. 31
East Fork: Williams, Ind.	10	Mar. 30	2	13.6	Mar. 31
White: Petersburg, Ind.	16	Mar. 27	6	22.5	1
Wabash:					
Mt. Carmel, Ill.	17	1	7	21.0	3
Grayville, Ill.				19.7	4
New Harmony, Ind.	15	1	7	16.4	4
South Chickamauga Creek: Chickamauga, Tenn.	10	Mar. 31	2	13.2	1
Ohio:					
Shawneetown, Ill.	33	Mar. 30	5	35.2	2
Dam No. 50, Fords Ferry, Ky.	34	Mar. 29	7	37.8	2
White Basin					
Black: Black Rock, Ark.	14	Mar. 10	12	22.1	Mar. 28
White:					
				35.3	Feb. 6
Clarendon, Ark.	26	Jan. 22	23	31.5	Feb. 27
				29.0	5
				33.9	Feb. 10
St. Charles, Ark.	25	Jan. 11	27	27.3	7
Arkansas Basin					
Neosho: Emporia, Kans.	22	10	11	23.8	10–11
Red Basin					
Ouachita: Monroe, La.	40	4	15	40.3	11–12
Black: Jonesville, La.	50	Feb. 13	23	51.8	Mar. 1–4
				51.9	2
Sulphur:					
		10	11	38.8	10
Hagansport, Tex.	38	26	27	39.9	26
		30	[2]	40.9	30
Naples, Tex.	22	Mar. 26	4	26.2	Mar. 31
McCartney Bridge, Tex.				24.2	4
Lower Mississippi Basin					
St. Francis:					
				22.8	Mar. 21, 22
Fisk, Mo.	20	Mar. 19	6	23.3	Mar. 29, 30
St. Francis, Ark.	18	Mar. 20	12	21.6	Mar. 7
Coldwater: Sarah, Miss.	18	13	15	21.0	13
Tallahatchie: Swan Lake, Miss.	26	Mar. 27	25	29.6	2
Yazoo:					
Greenwood, Miss.	35	1	13	37.2	5
				36.2	Feb. 10
Yazoo City, Miss.	29	Jan. 3	[2]	33.4	18
Mississippi:					
Caruthersville, Mo.	32	Mar. 31	9	34.9	5
Baton Rouge, La.	35	15	15	35.0	15
Atchafalaya Basin					
Atchafalaya:					
Melville, La.	37	8	18	37.4	15
				28.8	Feb. 23–Mar. 1
Atchafalaya, La.	25	Jan. 17	May 8		
				28.0	18–19
Morgan City, La.	[3] 6	Feb. 18	[2]	8.0	Mar. 21
WEST GULF OF MEXICO DRAINAGE					
Nezpique: Basile, La.	22	26	May 1	22.3	29
Calcasieu: Kinder, La.	16	12	14	16.8	13
		24	30	19.8	25
Sabine: Mineola, Tex.	14	Mar. 31	2	16.0	1
Neches: Evadale, Tex.	16	2	6	16.2	5
Trinity: Liberty, Tex.	24	23	26	25.6	24
Guadalupe:					
Gonzales, Tex.	20	26	28	29.3	27
Cuero, Tex.	23	28	30	26.2	28
Victoria, Tex.	21	25	May 2	28.4	30
Nueces:					
Cotulla, Tex.	15	25	25	15.8	25
Three Rivers, Tex.	37	26	30	39.1	27
Rio Grande:					
		24	24	21.4	24
Rio Grande City, Tex.	21	25	27	23.3	26
Hidalgo, Tex.	21	26	28	21.7	28
Mercedes, Tex.	21	24	30	23.6	28
Brownville, Tex.	18	26	May 1	19.0	30

[1] Provisional.
[2] Continued at end of month.
[3] Flood stage or higher reached intermittently.